1 - (0606-S 2012-Paper 2/2-Q1) - *SETS*

It is given that P is the set of prime numbers, S is the set of square numbers and N is the set of numbers between 10 and 90. Write each of the following statements using set notation.

(i) 7 is a prime number. [1]

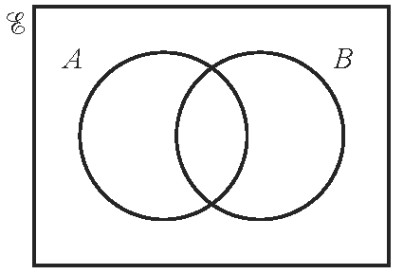
(ii) 8 is not a square number. [1]

(iii) There are 6 square numbers between 10 and 90. [1]

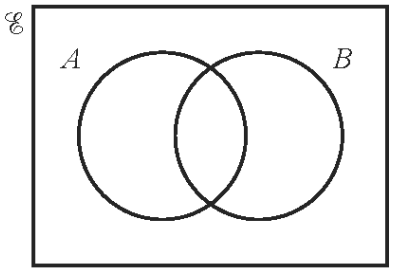
2 - (0606-S 2012-Paper 2/3-Q6) - *SETS*

By shading the Venn diagrams below, investigate whether each of the following statements is true or false. State your conclusions clearly.

(i) $A \cap B' = (A' \cap B)'$ [2]

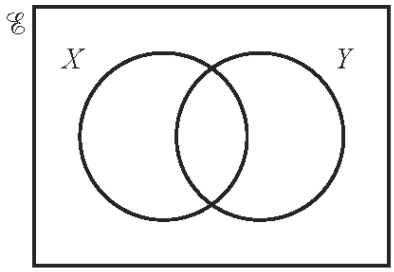


$A \cap B'$

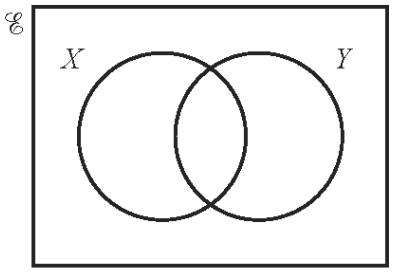


$(A' \cap B)'$

(ii) $X \cap Y = X' \cup Y'$ [2]

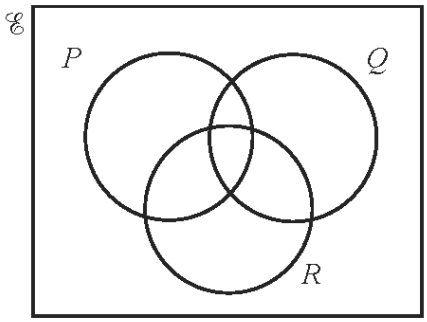


$X \cap Y$

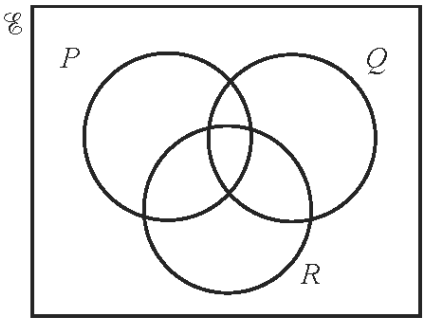


$X' \cup Y'$

(iii) $(P \cap Q) \cup (Q \cap R) = Q \cap (P \cup R)$ [2]



$(P \cap Q) \cup (Q \cap R)$



$Q \cap (P \cup R)$

3 - (0606-W 2012-Paper 2/1-Q2) - *SETS*

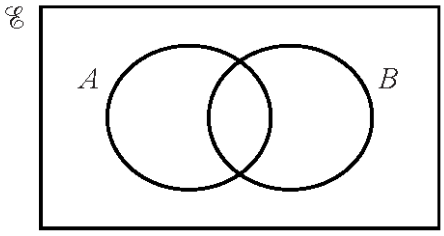
(a) It is given that $\mathscr{E}$ is the set of integers, P is the set of prime numbers between 10 and 50, F is the set of multiples of 5, and T is the set of multiples of 10. Write the following statements using set notation.

(i) There are 11 prime numbers between 10 and 50. [1]

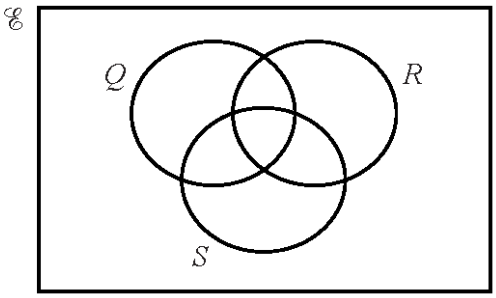
(ii) 18 is not a multiple of 5. [1]

(iii) All multiples of 10 are multiples of 5. [1]

(b) **(i)** In the Venn diagram below shade the region that represents $(A' \cap B) \cup (A \cap B')$. [1]



(ii) In the Venn diagram below shade the region that represents $Q \cap (R \cup S')$. [1]



4 - (0606-S 2013-Paper 2/1-Q9) - *SETS*

It is given that $x \in \mathbb{R}$ and that $\mathscr{E} = \{x : -5 < x < 12\}$,
$S = \{x : 5x + 24 > x^2\}$,
$T = \{x : 2x + 7 > 15\}$.

Find the values of x such that

(i) $x \in S$, [3]

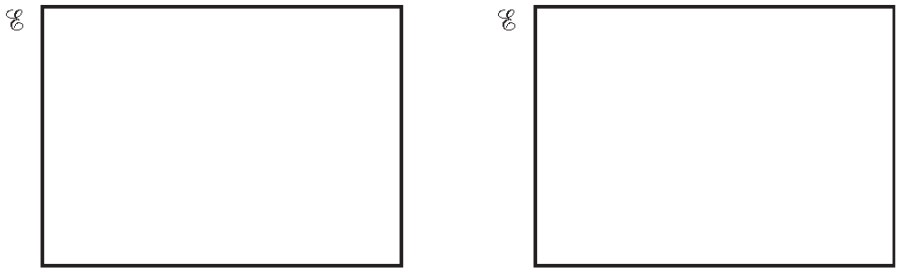
(ii) $x \in S \cup T$, [2]

(iii) $x \in (S \cap T)'$. [3]

5 - (0606-S 2014-Paper 2/3-Q4) - *SETS*

(a) Illustrate the following statements using the Venn diagrams below.

(i) $A \cup B = A$ **(ii)** $A \cap B \cap C = \varnothing$ [2]



(b) It is given that $\mathscr{E}$ is the set of integers between 1 and 100 inclusive. S and C are subsets of $\mathscr{E}$, where S is the set of square numbers and C is the set of cube numbers. Write the following statements using set notation.

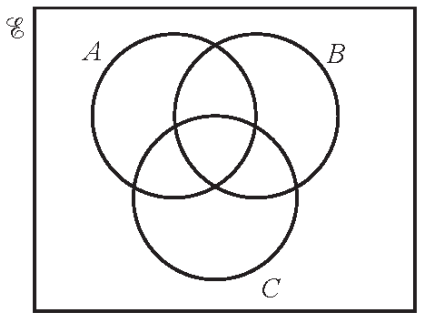
(i) 50 is not a cube number. [1]

(ii) 64 is both a square number and a cube number. [1]

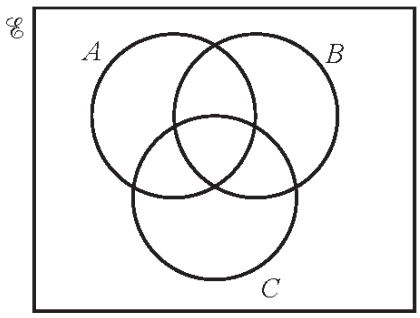
(iii) There are 90 integers between 1 and 100 inclusive which are not square numbers. [1]

6 - (0606-W 2014-Paper 2/1-Q1) - *SETS*

(a) On each of the Venn diagrams below shade the region which represents the given set.



$(A \cap B) \cup C'$



$A' \cap (B \cup C)$ [2]

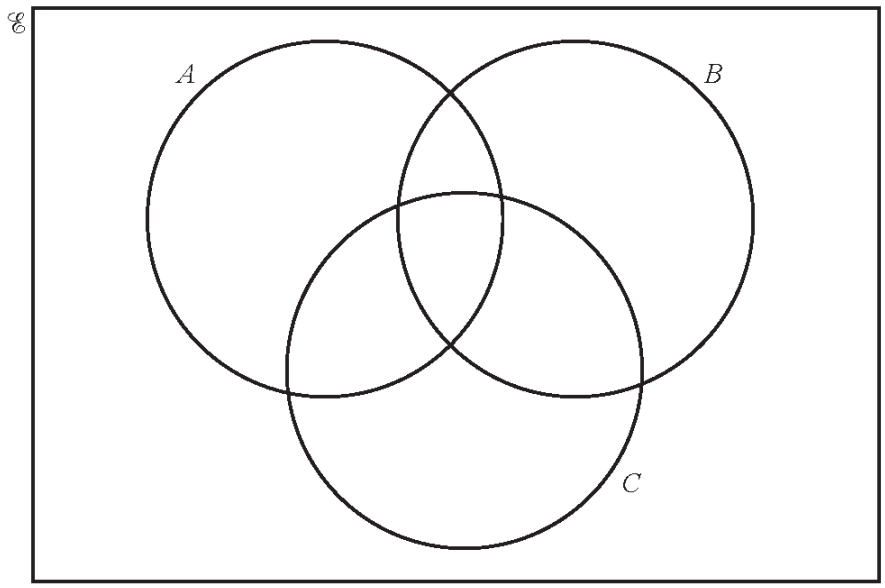
(b) In a year group of 98 pupils, F is the set of pupils who play football and H is the set of pupils who play hockey. There are 60 pupils who play football and 50 pupils who play hockey. The number that play both sports is x and the number that play neither is $30 - 2x$. Find the value of x. [3]

7 - (0606-S 2015-Paper 2/2-Q1) - *SETS*

The universal set contains all the integers from 0 to 12 inclusive. Given that

$A = \{1, 2, 3, 8, 12\}$, $B = \{0, 2, 3, 4, 6\}$ and $C = \{1, 2, 4, 6, 7, 9, 10\}$,

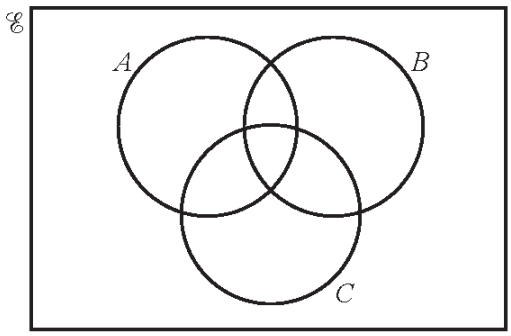
(i) complete the Venn diagram, [3]



(ii) state the value of $n(A' \cap B' \cap C)$, [1]

(iii) write down the elements of the set $A' \cap B \cap C$. [1]

8 - (0606-S 2015-Paper 2/1-Q11) - *SETS*



The Venn diagram above shows the sets A, B and C. It is given that
$n(A \cup B \cup C) = 48$,
$n(A) = 30$, $n(B) = 25$, $n(C) = 15$,
$n(A \cap B) = 7$, $n(B \cap C) = 6$, $n(A' \cap B \cap C') = 16$.

(i) Find the value of x, where $x = n(A \cap B \cap C)$. [3]

(ii) Find the value of y, where $y = n(A \cap B' \cap C)$. [3]

(iii) Hence show that $A' \cap B' \cap C = \varnothing$. [1]

9 - (0606-S 2016-Paper 2/1-Q2) - *SETS*

(a) Illustrate the statements $A \subset B$ and $B \subset C$ using the Venn diagram below. [1]

(b) It is given that
the elements of set $\mathscr{E}$ are the letters of the alphabet,
the elements of set P are the letters in the word *maths*,
the elements of set Q are the letters in the word *exam*.

(i) Write the following using set notation.

The letter h is in the word *maths*. [1]

(ii) Write the following using set notation.

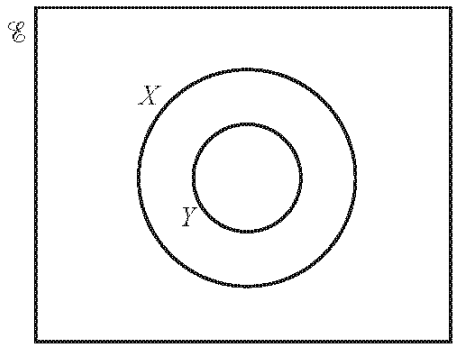
The number of letters occurring in both of the words *maths* and *exam* is two. [1]

(iii) List the elements of the set $P \cap Q'$. [1]

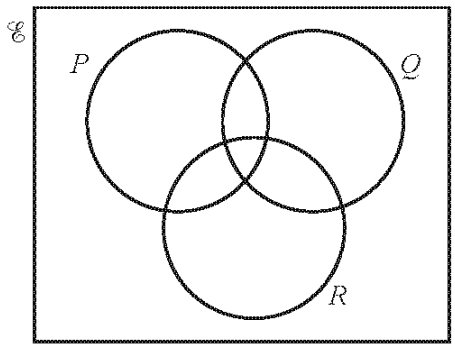
10 - (0606-S 2017-Paper 2/1-Q7) - *SETS*

(a) On each of the Venn diagrams below shade the region which represents the given set.

$X \cap Y'$



$P' \cap Q \cap R$



[2]

(b) In a group of students, each student studies at most two of art, music and design. No student studies both music and design.

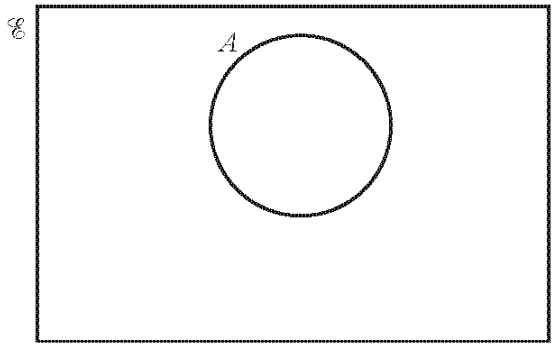
A denotes the set of students who study art,
M denotes the set of students who study music,
D denotes the set of students who study design.

(i) Write the following using set notation.

No student studies both music and design. [1]

There are 100 students in the group. 39 students study art, 45 study music and 36 study design. 12 students study both art and music. 25 students study both art and design.

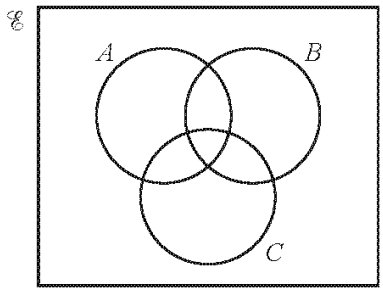
(ii) Complete the Venn diagram below to represent this information and hence find the number of students in the group who do not study any of these subjects.



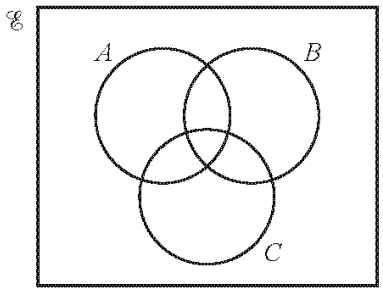
[3]

11 - (0606-W 2017-Paper 2/3-Q1) - *SETS*

(a) On each of the diagrams below, shade the region which represents the given set.

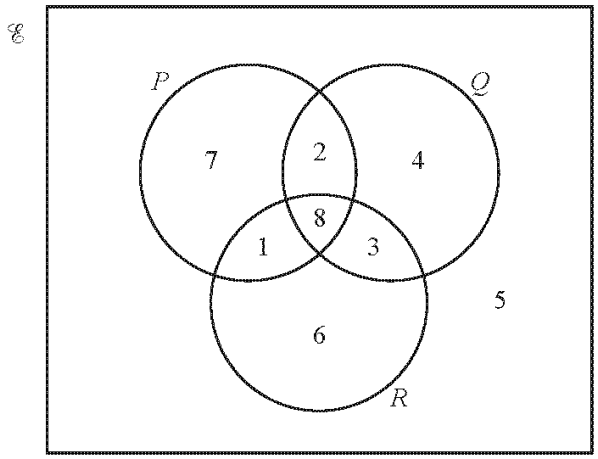


$(A \cup B) \cap C'$



$(A \cap B') \cup C$ [2]

(b)



The Venn diagram shows the number of elements in each of its subsets.

Complete the following.

n(P') = ...

n(($Q \cup R$) $\cap$ P) = ...

n($Q' \cup P$) = ... [3]

12 - (0606-S 2018-Paper 2/1-Q1) - *SETS*

A, B and C are subsets of the same universal set.

(i) Write each of the following statements in words.

(a) $A \not\subset B$ [1]

(b) $A \cap C = \varnothing$ [1]

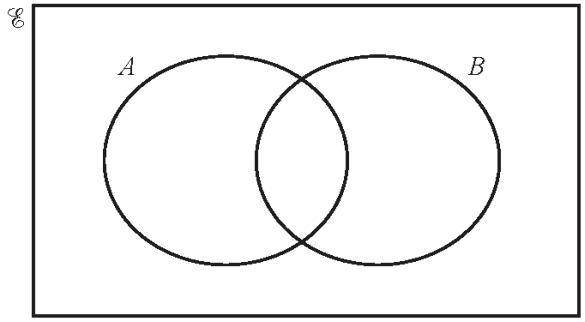
(ii) Write each of the following statements in set notation.

(a) There are 3 elements in set A or B or both. [1]

(b) x is an element of A but it is not an element of C. [1]

13 - (0606-S 2018-Paper 2/2-Q2) - *SETS*

(a) On the Venn diagram below, shade the region that represents $A \cap B'$.



[1]

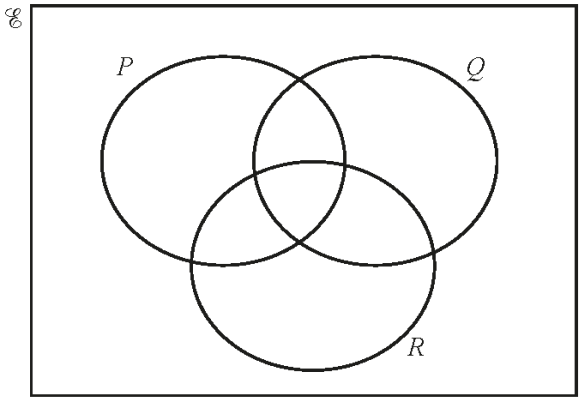
(b) The universal set $\mathscr{E}$ and sets P, Q and R are such that

$(P \cup Q \cup R)' = \varnothing$, $P' \cap (Q \cap R) = \varnothing$,

$\text{n}(Q \cap R) = 8$, $\text{n}(P \cap R) = 8$, $\text{n}(P \cap Q) = 10$,

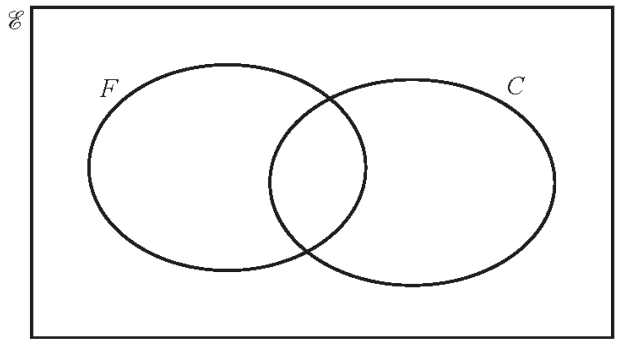
$\text{n}(P) = 21$, $\text{n}(Q) = 15$, $\text{n}(\mathscr{E}) = 30$.

Complete the Venn diagram to show this information and state the value of $\text{n}(R)$.



$\text{n}(R) =$ ..... [4]

14 - (0606-W 2018-Paper 2/2-Q2) - *SETS*



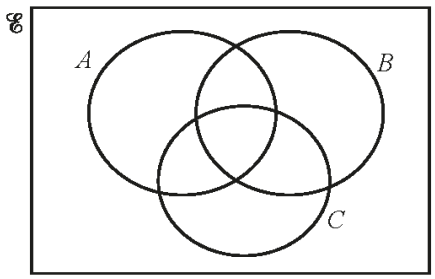
There are 105 boys in a year group at a school. Some boys play football (F) and some play cricket (C).

- x boys play both football and cricket.
- The number of boys that play neither game is the same as the number of boys that play both.
- 40 boys play cricket.
- The number of boys that only play football is twice the number of boys that only play cricket.

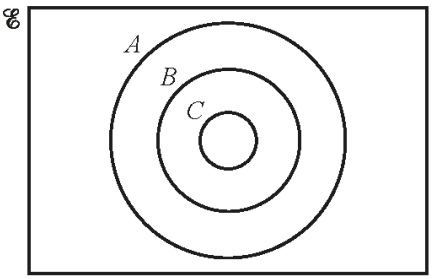
Complete the Venn diagram and find the value of x. [5]

15 - (0606-W 2018-Paper 2/3-Q2) - *SETS*

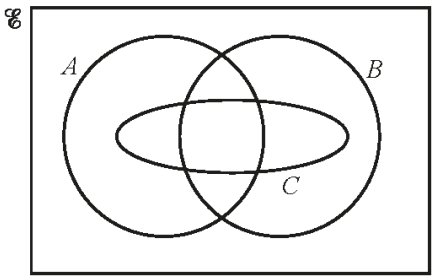
On each of the Venn diagrams below, shade the region indicated.



$(A \cup B \cup C)'$



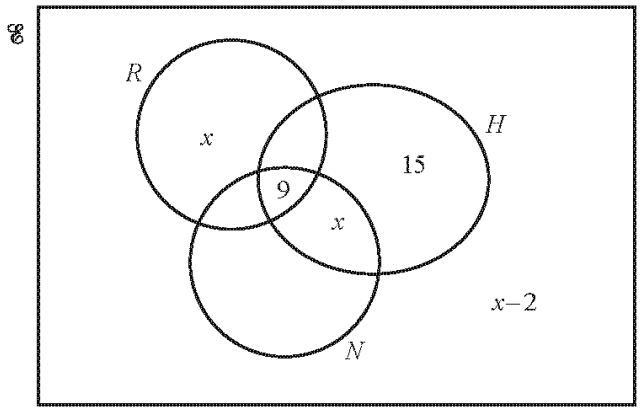
$A \cap B \cap C'$



$(A \cap B) \cup C'$

[3]

16 - (0606-W 2018-Paper 2/1-Q11) - *SETS*



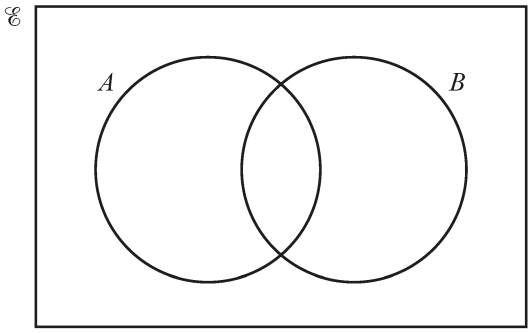
There are 70 girls in a year group at a school. The Venn diagram gives **some** information about the numbers of these girls who play rounders (R), hockey (H) and netball (N).

$n(R) = 28$ $n(H) = 38$ $n(N) = 35$.

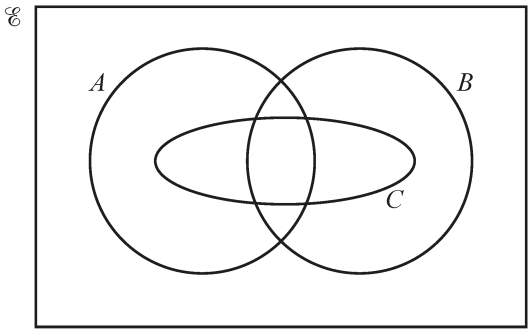
Find the value of x and hence the number of girls who play netball only. [6]

17 - (0606-W 2019-Paper 2/2-Q1) - *SETS*

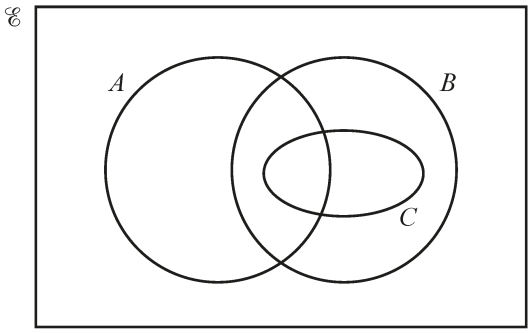
On each of the Venn diagrams below, shade the region indicated.



$(A' \cap B) \cup (A \cap B')$



$(A \cap B) \cup C$



$A \cap B \cap C'$

[3]